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September 19, 1994

ARRIS, JR. BECK BARRETT III

vain Legrini* STEARNS*

SCIENTIFIC STAFF DANIEL S. DIXLER, PH. D. CHARLES V. BREDER, PH. D. POBERT A. MATHEWS, PH. D. JOHN P. MODDERMAN, PH. D. HOLLY HUTMIRE FOLEY JUSTIN C. POWELL, PH. D. JANETTE HOUK, PH. D. LESTER BORODINSKY, PH. D.

TELECOMMUNICATIONS ENGINEER CHARLES F. TURNER

*NOT ADMITTED IN D.C.

WRITER'S DIRECT DIAL NUMBER (202) 434-4136

DOCKET FILE COPY OPIGINAL

Mr. William F. Caton Acting Secretary Federal Communications Commission 1919 M Street, N.W. Room 222 Washington, D.C.

SEP 2 0 1994

Checker Company

FCC ET Docket No. 94-32,

20554

Notice of Inquiry,

Allocation of Spectrum Below 5 GHz Transferred

from Federal Government Use;

In the Matter of Amendment of Part 15 of the Rules With Regard to the Operation of Spread

Spectrum Antennas,

Petition for Rule Making and Request for

Immediate Waiver by Western Multiplex Corporation,

RM-8435

Ex Parte Presentation

Dear Mr. Caton:

Pursuant to Section 1.1206(a)(2) of the Commission's rules, as adopted in the Report and Order in Gen. Docket No. 86-225, 2 FCC Rcd. 3011 (1987), enclosed are copies of the engineering material distributed by the Southern Company during ex parte meetings held on September 19, 1994 concerning the abovecaptioned matters. Mr. Jim Davis of the Southern Company met, along with myself and Joseph M. Sandri, Jr. of this firm, with:

- 1. Richard Smith, Chief of the Office of Engineering and Technology; and
- 2. James Coltharp, Office of Commissioner Andrew C. Barrett.

No. of Copies rec'd List ABCDE

Mr. William F. Caton September 19, 1994 Page 2

Kindly place this material in the public file. Should you have any comments or questions, please do not hesitate to contact the undersigned.

Cordially yours,

CAROLE C. HARRIS/JAN.L.

Carole C. Harris

Attorney for

Southern Company

Enclosure

June 14, 1994

Mr. Jim Davis
Southern Communications Services
600 North 18th Street
Birmingham, AL 35291

RE: Reliability Calculations for Larus Radios

Dear Jim:

Enclosed please find reliability calculations for three hypothetical microwave paths using the Larus 4-DS1 2.4 GHz spread spectrum radio. The first path has difficult climate and terrain, the second has less difficult and the third shows good climate and terrain. The other factors were kept constant and then the path length was adjusted for each path until the outage objective of 100 seconds per year (99.99968% availability) was obtained.

The calculations show that to meet the Southern Company Services' reliability objective, path lengths must be kept under 4 to 6 miles maximum, depending on terrain and climate.

Please call me at 1869 if you have any questions or require additional information.

Sincerely,

John Post Survey Manager

JEP/me

Enclosures

CC: Kishore Asirvadam, JEFA International

* Microwave Path Analysis * ***********

*****	****	*****	
equency	MHz:		2450
4		מ מידים	SITE B
titude	DMS:	33 :30:0 00 N	33 :33:15.0 N
ngitude	DMS:	087:45:00.0 W	087:43:00.0 W
evation - AMSL	Ft:	0	0
	Ft:		0
imuth	Deg:	027.258	207.277
th Length - Inverse Pos.	Mi/km:	4.200 / 6.759	
th Ings	dB ⋅	116.85> <	116.85
ffraction Loss in Attenuation cansmission Line Type cansmission Line Length cansmission Line Loss/100 Ft cansmission Line Loss	dB.	0.00	
in Attenuation	dB.	0.00	
anemission Line Type	٠.	0.00	
answission Line Length	ਸ਼- ਸ਼-	0 0	0.0
ansmission Line Logs/100 Ft	dB.	0.00	0.00
answission line loss, 100 rc	dD.	0.00	0.00
distribution nois	dB.	0.00	0.00
ransmission Line Loss/100 Ft ransmission Line Loss imper Loss itenna Radome Loss it Stdby Switch Loss eceiver Hybrid Loss it Power Splitter Loss	ab:	0.00	0.00
itellia kadome Loss	GE:	0.00	0.00
art Study Switch Loss	ab:	0.00	0.00
ceiver Hyprid Loss	ab:	0.00	
it Power Splitter Loss	aB:	0.00	0.00
branching bood	· ·	0.00	0.00
onnector & Safety Loss	dB:	1.00	1.00
nit Attenuator Pad Loss	dB:	0.00	0.00
or Attenuator Pad Loss	dB:	0.00	0.00
otal System Loss	dB:	118.85> <	118.85
	= = = :	-	
<pre>? Manufacturer & Model No. ransmitter Stability (+/-)</pre>	:	LARUS	LARUS
ransmitter Stability (+/-)	₹:	4DS1	16 QAM
ntenna Polarization ntenna Mfr., Size & Type	:	0.4.11	0.4.11
ntenna Mir., Size & Type	:	24"	24"
ntenna Height - Pri/Div - AGL	Ft:	100.0 / 0.0	0.0 / 0.0
ntenna Gain - Pri/Div	dB1:	24.00 / 0.00	24.00 / 0.00
otal Primary Antenna Gain	dBi:	48.00	
ransmitter Power	dBm:	13.00	13.00
otal System Gain		61.00	61.00
ffective Radiated Power	dBm:	36.00	36.00
nfaded Receive Signal Level	dBm:	-57.85> <	-57.85
x Threshold	dBm:	-82.50	-82.50
omposite Fade Margin	dB:	+24.70	+24.70
ropagation Reliability		99.99968017	
	c/Year:		100.85
* Outages are one-way severe			
	Terrain	Rough.: 40.0 Avrg	
ade Margins (dB): DFM: 75			l: Digital
TFM: 24.	7	EIFM: 0	

JEFA INTERNATIONAL, INC 1108 DOBIE DRIVE PLANO, TX 75074 09:01:47 06-10-1994 SITEAB.LAR

* Microwave Path Analysis * ***********

****	****	*****	
equency		2450	2450
te	:	SITA A	SITE B
titude	DMS:	33 :30:0 00 N 087:45:00.0 W	33 :33:35.0 N
ngitude	DMS:	087:45:00.0 W	087:43:00.0 W
evation - AMSL			0
wer Height	Ft:		0
imuth	Deg:	025.045	205.063
th Length - Inverse Pos.	Mi/km:	4.543 / 7.312	
th Loss	dB:	117.53> <	117.53
ffraction Loss	dB:	0.00	
in Attenuation	dB:	0.00	
ansmission Line Type	:	0.0	
cansmission Line Length	Ft:	0.0	0.0
ansmission Line Loss/100 Ft	dB:	0.00	0.00
cansmission Line Loss	dB:	0.00	0.00
imper Loss	dB:	0.00	0.00
itenna Radome Loss	dB:	0.00	0.00
nit Stdby Switch Loss	dB:	0.00	0.00
ransmission Line Loss mper Loss tenna Radome Loss nit Stdby Switch Loss ceiver Hybrid Loss	dB:	0.00	0.00
nit Power Splitter Loss	dB:	0.00	0.00
F Branching Loss	dB:	0.00	0.00
onnector & Safety Loss	dB:		1.00
nit Attenuator Pad Loss	dB:		
eyr Attenuator Pad Loss	dB:	0.00	0.00
ovr Attenuator Pad Loss			
		119.53> <	119.53
F Manufacturer & Model No. ransmitter Stability (+/-)	:	LARUS	LARUS
ransmitter Stability (+/-)	왕:	4DS1	16 QAM
ntenna Polarization	:		
ntonna Mfr Cigo & Time	:	24"	24"
ntenna Height - Pri/Div - AGL	Ft:	100.0 / 0.0	0.0 / 0.0
ntenna Gain - Pri/Div	dBi:	24.00 / 0.00	24.00 / 0.00
otal Primary Antenna Gain	dBi:	48.00	•
ntenna Height - Pri/Div - AGL ntenna Gain - Pri/Div otal Primary Antenna Gain ransmitter Power	dBm:	13.00	13.00
otal System Gain		61.00	61.00
ffective Radiated Power	dBm:	36.00	36.00
nfaded Receive Signal Level	dBm:	-58.53> <	-58.53
	= = = :		
x Threshold			-82.50
omposite Fade Margin			+24.00
	= = = :		
ropagation Reliability	ે :	99.99968282	99.99968282
	c/Year:		100.02
* Outages are one-way severe	errored	-seconds per year for	r 1x10E-6 BER * *
limate & Terrain: 4.000	Terrain	Rough.: 60.0 Avrg	. Temp: 68
ade Margins (dB): DFM: 75		AIFM: 0 Mode:	l: Digital
TFM: 24.0	כ	EIFM: 0	

JEFA INTERNATIONAL, INC 1108 DOBIE DRIVE PLANO, TX 75074 09:04:15 06-10-1994 SITEAB.LAR

* Microwave Path Analysis * ***********

****	****	*****	
requency	MHz:	2450	2450
ite	:	SITA A	SITE B
atitude		33 :30:0 00 N	
The state of the s	DMS.	087:45:00.0 W	087:43:00 0 W
ongitude	Ft:		0
levation - AMSL			
ower Height	Ft:		0
zimuth		018.684	198.702
ath Length - Inverse Pos.			
ath Loss	dB:	119.95> <	119.95
iffraction Loss	dB:	0.00	
ain Attenuation	dB:	0.00	
ransmission Line Type	:		
ransmission Line Length	Ft:	0.0	0.0
ransmission Line Loss/100 Ft			0.00
ransmission Line Loss		0.00	0.00
imper Loss		0.00	0.00
ntenna Radome Loss	dB:		0.00
	dB:	0.00	
nit Stdby Switch Loss	aB:	0.00	0.00
eceiver Hybrid Loss	dB:	0.00	0.00
mit Power Splitter Loss	dB:	0.00	0.00
F Branching Loss	dB:	0.00	0.00
onnector & Safety Loss	dB:	1.00	1.00
mit Attenuator Pad Loss	dB:	0.00	0.00
cvr Attenuator Pad Loss	dB:	0.00	0.00
otal System Loss	an.	121.95> <	121 05
DLAI DYBLEW HOSS	ab:	121.33> <	141.33
	= = = :		
F Manufacturer & Model No.	= = = :	LARUS	LARUS
F Manufacturer & Model No. ransmitter Stability (+/-)	= = = :		
F Manufacturer & Model No. ransmitter Stability (+/-) ntenna Polarization	= = = : : %:	LARUS 4DS1	LARUS 16 QAM
F Manufacturer & Model No. ransmitter Stability (+/-) ntenna Polarization ntenna Mfr., Size & Type	= = = : : %: :	LARUS 4DS1	= = = = = = = = = = = = = = = = = = =
F Manufacturer & Model No. ransmitter Stability (+/-) ntenna Polarization ntenna Mfr., Size & Type ntenna Height - Pri/Div - AGL	= = = : %: : : Ft:	LARUS 4DS1 24" 100.0 / 0.0	LARUS 16 QAM 24" 0.0 / 0.0
F Manufacturer & Model No. ransmitter Stability (+/-) ntenna Polarization ntenna Mfr., Size & Type ntenna Height - Pri/Div - AGL ntenna Gain - Pri/Div	= = = : %: : : : : : :	LARUS 4DS1 24" 100.0 / 0.0 24.00 / 0.00	= = = = = = = = = = = = = = = = = = =
F Manufacturer & Model No. ransmitter Stability (+/-) ntenna Polarization ntenna Mfr., Size & Type ntenna Height - Pri/Div - AGL ntenna Gain - Pri/Div otal Primary Antenna Gain	= = = : %: : : : : : : : : : :	LARUS 4DS1 24" 100.0 / 0.0 24.00 / 0.00 48.00	LARUS 16 QAM 24" 0.0 / 0.0 24.00 / 0.00
F Manufacturer & Model No. ransmitter Stability (+/-) ntenna Polarization ntenna Mfr., Size & Type ntenna Height - Pri/Div - AGL ntenna Gain - Pri/Div	= = = : %: : : : : : : : : : :	LARUS 4DS1 24" 100.0 / 0.0 24.00 / 0.00	LARUS 16 QAM 24" 0.0 / 0.0
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F Manufacturer & Model No. ransmitter Stability (+/-) ntenna Polarization ntenna Mfr., Size & Type ntenna Height - Pri/Div - AGL ntenna Gain - Pri/Div otal Primary Antenna Gain ransmitter Power	= = = : %: : : : : : : : : : :	LARUS 4DS1 24" 100.0 / 0.0 24.00 / 0.00 48.00 13.00	LARUS 16 QAM 24" 0.0 / 0.0 24.00 / 0.00
F Manufacturer & Model No. ransmitter Stability (+/-) ntenna Polarization ntenna Mfr., Size & Type ntenna Height - Pri/Div - AGL ntenna Gain - Pri/Div otal Primary Antenna Gain ransmitter Power otal System Gain	= = = : %: %: : : : : : : : : : : : : : : : :	LARUS 4DS1 24" 100.0 / 0.0 24.00 / 0.00 48.00 13.00	LARUS 16 QAM 24" 0.0 / 0.0 24.00 / 0.00 13.00
F Manufacturer & Model No. ransmitter Stability (+/-) ntenna Polarization ntenna Mfr., Size & Type ntenna Height - Pri/Div - AGL ntenna Gain - Pri/Div otal Primary Antenna Gain ransmitter Power otal System Gain	= = = : %: %: : : : : : : : : : : : : : : : :	LARUS 4DS1 24" 100.0 / 0.0 24.00 / 0.00 48.00 13.00	LARUS 16 QAM 24" 0.0 / 0.0 24.00 / 0.00 13.00
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F Manufacturer & Model No. ransmitter Stability (+/-) ntenna Polarization ntenna Mfr., Size & Type ntenna Height - Pri/Div - AGL ntenna Gain - Pri/Div otal Primary Antenna Gain ransmitter Power otal System Gain = = = = = = = = = = = = = = = = = = =	= = = :	LARUS 4DS1 24" 100.0 / 0.0 24.00 / 0.00 48.00 13.00 61.00 = = = = = = = = = = = = = = = = = =	LARUS 16 QAM 24" 0.0 / 0.0 24.00 / 0.00 13.00 61.00 ===================================
F Manufacturer & Model No. ransmitter Stability (+/-) ntenna Polarization ntenna Mfr., Size & Type ntenna Height - Pri/Div - AGL ntenna Gain - Pri/Div otal Primary Antenna Gain ransmitter Power otal System Gain = = = = = = = = = = = = = = = = = = =	= = = :	LARUS 4DS1 24" 100.0 / 0.0 24.00 / 0.00 48.00 13.00 61.00 = = = = = = = = = = = = = = = = = =	LARUS 16 QAM 24" 0.0 / 0.0 24.00 / 0.00 13.00

JEFA INTERNATIONAL, INC 1108 DOBIE DRIVE PLANO, TX 75074 09:07:03 06-10-1994 SITEAB.LAR

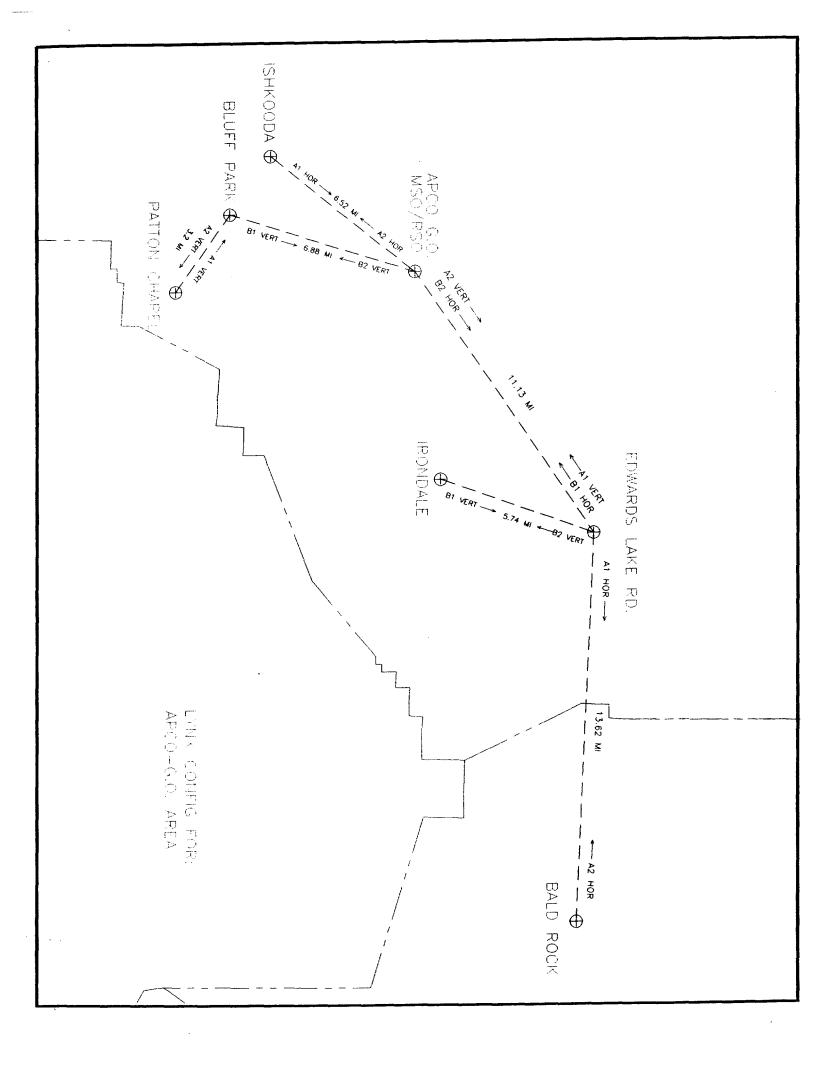


Table showing seconds and percentage availability

#	Seconds	<pre>% Availability</pre>	Seconds	<pre>% Availability</pre>
	10	99.99997	800	99.99746
	20	99.99994	850	99.99730
	30	99.99990	900	99.99715
	40	99 .9998 7	950	99.99699
	50	99.99984	1000	99.99683
	60	99.99981	1050	99.99667
	70	99.99978	1100	99.99651
	80	99.99975	1150	99.99635
	90	99.99971	1200	99.99619
15max	100	99.99968	1250	99.99604
-	120	99.99962	1300	99.99588
	140	99.99956	1350	99.99572
	160	99.99949	1400	99.99556
	180	99 .9994 3	1450	99.99540
	200	99 .9993 7	1500	99.99524
	220	99.9 993 0	1550	99.99508
	240	99.99924	1600	99.99493
	260	99 .9991 8	1650	99.99477
	280	99 .9991 1	1700	99.99461
15-20		99 .9990 5	1750	99.99445
	320	99.99899	1800	99.99429
	340	99 .9989 2	1850	99.99413
æ -20-3¢	` 360	99 .9 9886	1900	99.99398
	380	99 .9988 0	1950	99.99382
	400	99 .9987 3	2000	99.99366
	420	99.99867	2050	99.99350
	440	99 .9986 0	2100	99.99334
-	460	99 .9985 4	2150	99.99318
	480	99 .9984 8	2200	99.99302
	500	99 .9984 1	2250	99.99287
	520	99 .998 35	2300 -	99.99271
	540	99 .9982 9	2350	99.99255
	560	99.99822	2400	99.99239
	580	99.99816	2450	99.99223
	600	99.99810	2500	99.99207
	650	- 99:99794	2550	99.99191
	700	99.99778	2600	99.99176
	750	99.99762	2650	99.99160

June 14, 1994

Mr. Jim Davis Southern Communications Services 600 North 18th Street Birmingham, AL 35291

RE: Reliability Calculations for Western Multiplex 2.4 GHz Spread Spectrum Radios

Dear Jim:

Enclosed please find reliability calculations for nine hypothetical microwave paths using Western Multiplex 1-DS1 2.4 GHz spread spectrum radios. The Lynx12 with +28.0 dBm transmit power and no restriction on EIRP (old FCC rules) and the LynxCP2 with +13.0 dBm maximum EIRP of +36.0 dBm (new FCC rules) are shown. All the paths have 100 or 101 seconds per year predicted outage (99.99968% availability).

Path Number	Radio Model	Transmit Power (dBm)	EIRP Climate/ Terrain (dBm)	Coax Length (feet)	Antenna Diameter (feet)	Path Length (miles)
1	Lynx12	+28.0	+50.0 difficult	174	4	10.78
2	Lynx12	+28.0	+50.0 average	174	4	11.68
3	Lynx12	+28.0	+56.5 difficult	174	8	19.62
4	Lynx12	+28.0	+56.5 average	174	8	21.26
5	LynxCP2	+13.0	+36.0 difficult	87	4	5.93
6	LynxCP2	+13.0	+36.0 average	87	4	6.42
7	LynxCP2	+13.0	+36.0 difficult	370	8	5.93
8	LynxCP2	+13.0	+36.0 difficult	87	8	7.99
9	LynxCP2	+13.0	+36.0 average	87 · ·	8	8.66

Please call me at 1869 if you have any questions or require additional information.

Sincerely,

John Post

Survey Manager

JEP/me

Enclosures

CC: Kishore Asirvadam, JEFA International

1

equency		2450	2450
te	:	SITA A	SITE B
titude	DMS:	33 :30:0 00 N 087:45:00.0 W	33:39:14.0 N
ngitude	DMS:	087:45:00.0 W	
evation - AMSL	Ft:		0
wer Height	Ft:		0
imuth		010.267	
	Mi/km:	10.778 / 17.3	16
th Loss		125.03> <	125.03
ffraction Loss	dB:	0.00	
in Attenuation ansmission Line Type ansmission Line Length	aB:	0.00	
ansmission Line Type	:	LDF5-50A	LDF5-50A
ansmission Line Length	Ft:	174.0	174.0
ansmission Line Loss/100 Ft			
ansmission Line Loss			4.00
mper Loss			0.50
	dB:		0.00
it Stdby Switch Loss			0.00
ceiver Hybrid Loss	dB:		0.00
it Power Splitter Loss			0.00
•	dB:		0.00
			0.50
it Attenuator Pad Loss			0.00
vr Attenuator Pad Loss	dB:	0.00 	0.00
otal System Loss	dB:	135.04> <	135.04
Manufacturer & Model No			Lynx12
cansmitter Stability (+/-)	*:	_2	
itenna Polarization	:		
itenna Mfr., Size & Type	:	4'	4′
ıtenna Height - Pri/Div - AGL	Ft:	114.0 / 0.0	114.0 / 0.0
itenna Gain - Pri/Div		27.00 / 0.00	27.00 / 0.00
tal Primary Antenna Gain	dBi:	5 4. 00	·
cansmitter Power	dBm:	28.00	28.00
otal System Gain		82.00	82.00
	dBm:		50.00
nfaded Receive Signal Level			
c Threshold		-	-90.00
omposite Fade Margin			+37.00
congestion Poliability			
copagation Reliability			99.99968162
	c/Year:		100.40 - 1×100-6 BED * *
* Outages are one-way severe limate & Terrain: 6.000			
ade Margins (dB): DFM: 81	retratu	Rough: 40.0 Avrg AIFM: 0 Mode	
TFM: 37.	0	EIFM: 0 Mode.	l: Digital
1FM: 3/.	J	EIFM: O	

JEFA INTERNATIONAL, INC 1108 DOBIE DRIVE PLANO, TX 75074

09:51:48 06-10-1994 SITEAB.L12

```
* Microwave Path Analysis *
                                                                            2
                          ********
                                   MHz: 2450
                                                              2450
equency
                                   : SITA A
                                  : SITA A SITE B

DMS: 33 :30:0 00 N 33 :40:02.0 N

DMS: 087:45:00.0 W 087:43:00.0 W
titude
ngitude
evation - AMSL
                                   Ft: 0
wer Height
                                   Ft: 0
                                  Deg: 009.463 189.481
imuth
imuth
th Length - Inverse Pos.
th Loss

Mi/km: 11.684 / 18.803
th Loss

dB: 125.74 ---> <--- 125.74
                                    dB: 0.00
dB: 0.00
ffraction Loss
in Attenuation
                                  dB:
ansmission Line Type : LDF5-50A
ansmission Line Length Ft: 174.0
ansmission Line Loss/100 Ft dB: 2.30
ansmission Line Loss dB: 4.00
mper Loss dB: 0.50
                                                             LDF5-50A
                                                             174.0
                                                             2.30
                                                             4.00
                                                             0.50

      mper Loss
      dB: 0.50
      0.50

      tenna Radome Loss
      dB: 0.00
      0.00

      it Stdby Switch Loss
      dB: 0.00
      0.00

      ceiver Hybrid Loss
      dB: 0.00
      0.00

      it Power Splitter Loss
      dB: 0.00
      0.00

      'Branching Loss
      dB: 0.00
      0.00

      onnector & Safety Loss
      dB: 0.50
      0.50

      it Attenuator Pad Loss
      dB: 0.00
      0.00

      evr Attenuator Pad Loss
      dB: 0.00
      0.00

tal System Loss dB: 135.74 ---> <--- 135.74
Manufacturer & Model No. : Lynx12 :ansmitter Stability (+/-) %:
otal System Gain dB: 82.00
                                                              82.00
* Outages are one-way severe errored-seconds per year for 1x10E-6 BER * * imate & Terrain: 4.000 Terrain Rough:: 100.0 Avrg. Temp: 68
ide Margins (dB): DFM: 81 AIFM: 0 Model: Digital TFM: 36.3 EIFM: 0
```

JEFA INTERNATIONAL, INC 1108 DOBIE DRIVE PLANO, TX 75074

09:53:23 06-10-1994 SITEAB.L12

********* 3 * Microwave Path Analysis * ******* MHz: 2450 2450 equency : SITA A : SITA A SITE B

DMS: 33 :30:0 00 N 33 :47:00.0 N

DMS: 087:45:00.0 W 087:43:00.0 W titude ngitude evation - AMSL Ft: 0 wer Height Ft: 0 Deg: 005.610 185.629 imuth
th Length - Inverse Pos.
th Loss

Mi/km: 19.621 / 31.577
th Loss

dB: 130.24 ---> <--- 130.24 imuth

 ffraction Loss
 dB:
 0.00

 in Attenuation
 dB:
 0.00

 ansmission Line Type
 : LDF5-50A
 LDF5-50A

 ansmission Line Length
 Ft: 174.0
 174.0

 ansmission Line Loss/100 Ft
 dB: 2.30
 2.30

 ansmission Line Loss
 dB: 4.00
 4.00

 mper Loss
 dB: 0.50
 0.50

 tenna Radome Loss
 dB: 0.00
 0.00

 it Stdby Switch Loss
 dB: 0.00
 0.00

 ceiver Hybrid Loss
 dB: 0.00
 0.00

 it Power Splitter Loss
 dB: 0.00
 0.00

 Branching Loss
 dB: 0.00
 0.00

 nnector & Safety Loss
 dB: 0.50
 0.50

 it Attenuator Pad Loss
 dB: 0.00
 0.00

 vr Attenuator Pad Loss
 dB: 0.00
 0.00

 tal System Loss
 dB: 140.24 --->
 <--- 140.24</td>

 dB: 0.00 dB: 0.00 ffraction Loss tal System Loss dB: 140.24 ---> <--- 140.24 Manufacturer & Model No. : Lynx12 Lynx12 ansmitter Stability (+/-) %: tenna Polarization :
tenna Mfr., Size & Type : 8' 8'
tenna Height - Pri/Div - AGL Ft: 114.0 / 0.0 114.0 / 0.0
tenna Gain - Pri/Div dBi: 33.50 / 0.00 33.50 / 0.00
tal Primary Antenna Gain dBi: 67.00
ansmitter Power dBm: 28.00 28.00 otal System Gain dB: 95.00 ifective Radiated Power dBm: 56.50 56.50 ifaded Receive Signal Level dBm:-45.24 ---> <--- -45.24

 : Threshold
 .
 .
 dBm:-90.00
 -90.00

 >mposite Fade Margin
 dB:+44.79
 +44.79

 topagation Reliability
 %: 99.99968119
 99.99968119

 stage
 Sec/Year: 100.53
 100.53
 * Outages are one-way severe errored-seconds per year for 1x10E-6 BER * * imate & Terrain: 6.000 Terrain Rough:: 40.0 Avrg. Temp: 68

ide Margins (dB): DFM: 81 AIFM: 0 Model: Digital

TFM: 44.8 EIFM: 0

> JEFA INTERNATIONAL, INC 1108 DOBIE DRIVE PLANO, TX 75074

09:49:09 06-10-1994 SITEAB.L12

4 ******* * Microwave Path Analysis * ******* MHz: 2450 2450 equency : SITA A : SITA A SITE B

DMS: 33 :30:0 00 N 33 :48:26.0 N

DMS: 087:45:00.0 W 087:43:00.0 W

Ft: 0 te titude ngitude evation - AMSL wer Height Ft: 0 Deg: 005.175 185.194 imuth th Length - Inverse Pos. Mi/km: 21.260 / 34.215 dB: 130.93 ---> <--- 130.93 dB: 0.00 ffraction Loss ffraction Loss
in Attenuation
ansmission Line Type
ansmission Line Length
ansmission Line Loss/100 Ft
ansmission Line Loss/100 Ft
ansmission Line Loss
ansmi dB: 140.94 ---> <--- 140.94 tal System Loss Manufacturer & Model No. : Lynx12 Lynx12 ansmitter Stability (+/-) %:

 tenna Polarization
 :
 8'

 tenna Mfr., Size & Type
 : 8'
 8'

 tenna Height - Pri/Div - AGL
 Ft: 114.0 / 0.0
 114.0 / 0.0

 tenna Gain - Pri/Div dBi: 33.50 / 0.00
 33.50 / 0.00

 tal Primary Antenna Gain dBi: 67.00
 67.00

 ansmitter Power dBm: 28.00
 28.00

 tal System Gain
 dB: 95.00
 95.00
 : Threshold - dBm:-90.00 -90.00 mposite Fade Margin dB:+44.09 +44.09
 topagation Reliability
 %: 99.99968235
 99.99968235

 stage
 Sec/Year: 100.17
 100.17

> JEFA INTERNATIONAL, INC 1108 DOBIE DRIVE PLANO, TX 75074

* Outages are one-way severe errored-seconds per year for 1x10E-6 BER * * imate & Terrain: 4.000 Terrain Rough:: 100.0 Avrg. Temp: 68

ide Margins (dB): DFM: 81 AIFM: 0 Model: Digital TFM: 44.1 EIFM: 0

09:47:56 06-10-1994 SITEAB.L12

****** 5 * Microwave Path Analysis * ****** MHz: 2450 2450 requency : SITA A SITE B DMS: 33 :30:0 00 N 33 :34:53.0 N atitude DMS: 087:45:00.0 W 087:43:00.0 W ongitude levation - AMSL Ft: 0 Ft: 0 ower Height Deg: 018.921 198.940 zimuth ath Length - Inverse Pos. Mi/km: 5.930 / 9.543 dB: 119.84 ---> <--- 119.84 ath Loss dB: 0.00 iffraction Loss ain Attenuation dB: 0.00 ransmission Line Type : LDF5-50A LDF5-50A Ft: 87.0 ransmission Line Length 87.0 dB: 2.30 ransmission Line Loss/100 Ft 2.30 dB: 2.00 ransmission Line Loss 2.00 dB: 0.50 umper Loss 0.50 dB: 0.00 ntenna Radome Loss 0.00 mit Stdby Switch Loss dB: 0.00 0.00 dB: 0.00 eceiver Hybrid Loss 0.00 dB: 0.00 mit Power Splitter Loss 0.00 F Branching Loss dB: 0.00 0.00 Connector & Safety Loss dB: 1.50 1.50 mit Attenuator Pad Loss dB: 0.00 0.00 cvr Attenuator Pad Loss dB: 0.00 0.00 otal System Loss dB: 127.85 ---> <--- 127.85 ntenna Polarization :
ntenna Mfr., Size & Type : 4' 4'
ntenna Height - Pri/Div - AGL Ft: 57.0 / 0.0 57.0 / 0.0
ntenna Gain - Pri/Div dBi: 27.00 / 0.00 27.00 / 0.00
lotal Primary Antenna Gain dBi: 54.00
lransmitter Power dBm: 13.00 13.00 Effective Radiated Power dBm: 36.00 36.00 Jnfaded Receive Signal Level dBm:-60.85 ---> <--- -60.85

Potal System Gain dB: 67.00

ite

Xx ThresholddBm:-90.00-90.00lomposite Fade MargindB:+29.20+29.20

 Propagation Reliability
 %: 99.99968056
 99.99968056

 Outage
 Sec/Year: 100.73
 100.73

* * Outages are one-way severe errored-seconds per year for 1x10E-6 BER * *

Climate & Terrain: 6.000 Terrain Rough:: 40.0 Avrg. Temp: 68 rade Margins (dB): DFM: 81 AIFM: 0 Model: Digital

TFM: 29.2 EIFM: 0

> JEFA INTERNATIONAL, INC 1108 DOBIE DRIVE PLANO, TX 75074

09:22:46 06-10-1994 SITEAB.CP2 *********************************

* Microwave Path Analysis *

******* MHz: 2450 2450 equency : SITA A SITE B te DMS: 33 :30:0 00 N 33 :35:20.0 N DMS: 087:45:00.0 W 087:43:00.0 W titude ngitude Ft: 0 evation - AMSL Ft: 0 wer Height Deg: 017.424 197.442 imuth th Length - Inverse Pos. Mi/km: 6.421 / 10.333 dB: 120.54 ---> <--- 120.54 dB: 0.00 th Loss 0.00 LDF5-50A 87.0 2.30 2.00

 mper Loss
 dB: 0.50
 0.50

 tenna Radome Loss
 dB: 0.00
 0.00

 it Stdby Switch Loss
 dB: 0.00
 0.00

 ceiver Hybrid Loss
 dB: 0.00
 0.00

 it Power Splitter Loss
 dB: 0.00
 0.00

 Branching Loss
 dB: 0.00
 0.00

 onnector & Safety Loss
 dB: 1.50
 1.50

 it Attenuator Pad Loss
 dB: 0.00
 0.00

 cvr Attenuator Pad Loss
 dB: 0.00
 0.00

 0.50 dB: 128.54 ---> <--- 128.54 otal System Loss . | Stability | Comparison | Comp otal System Gain dB: 67.00 67.00 ffective Radiated Power dBm: 36.00 36.00 afaded Receive Signal Level dBm:-61.54 ---> <--- -61.54 ropagation Reliability %: 99.99968235 99.99968235 1tage Sec/Year: 100.17 100.17 * Outages are one-way severe errored-seconds per year for 1x10E-6 BER * * limate & Terrain: 4.000 Terrain Rough: 100.0 Avrg. Temp: 68
ade Margins (dB): DFM: 81 AIFM: 0 Model: Digital
TFM: 28.5 EIFM: 0

> JEFA INTERNATIONAL, INC 1108 DOBIE DRIVE PLANO, TX 75074

09:35:18 06-10-1994 SITEAB.CP2 * Microwave Path Analysis * **********

requency	MHz: 2450		2450
.te	: SITA	. A	SITE B
ıtitude	DMS: 33 :	30:0 00 N	33 :34:53.0 N
ngitude	DMS: 087:	45:00.0 W	087:43:00.0 W
	Ft: 0		0
wer Height	Ft: 0		0
imuth		921	198.940
th Length - Inverse Pos.			
ith Loss		84> <	119.84
ffraction Loss	dB:	0.00	
ain Attenuation cansmission Line Type	qB:	0.00	1 DTC - CO.
cansmission Line Type	: LDF5	-50A	LDF5-50A
cansmission Line Length	Ft: 369.	5	
cansmission Line Loss/100 Ft	dB: 2.30		2.30
cansmission Line Loss			8.50
imper Loss	dB: 0.50		0.50
itenna Radome Loss	dB: 0.00		0.00
nit Stdby Switch Loss	dB: 0.00		0.00
eceiver Hybrid Loss	dB: 0.00		0.00
nit Power Splitter Loss	dB: 0.00		0.00
F Branching Loss	dB: 0.00		0.00
onnector & Safety Loss	dB: 1.50		1.50
nit Attenuator Pad Loss	dB: 0.00		0.00
imper Loss itenna Radome Loss nit Stdby Switch Loss eceiver Hybrid Loss nit Power Splitter Loss F Branching Loss onnector & Safety Loss nit Attenuator Pad Loss evr Attenuator Pad Loss	aB: 0.00		
SEST CHARAM TOAC	4D. 1/0		
otal System Loss	dB: 140.	84> <	140.84
		84> <	
F Manufacturer & Model No.	: Lynx		
<pre>F Manufacturer & Model No. ransmitter Stability (+/-)</pre>	: Lynx %:		
<pre>F Manufacturer & Model No. ransmitter Stability (+/-)</pre>	: Lynx %:		LynxCP2
F Manufacturer & Model No. ransmitter Stability (+/-) ntenna Polarization ntenna Mfr., Size & Type	: Lynx %: : : 8'	CP2	LynxCP2
F Manufacturer & Model No. ransmitter Stability (+/-) ntenna Polarization ntenna Mfr., Size & Type ntenna Height - Pri/Div - AGL	: Lynx %: : : 8' Ft: 340.	CP2 0 / 0.0	B' 340.0 / 0.0
F Manufacturer & Model No. ransmitter Stability (+/-) ntenna Polarization ntenna Mfr., Size & Type ntenna Height - Pri/Div - AGL ntenna Gain - Pri/Div	: Lynx %: : 8' Ft: 340. dBi: 33.5	CP2 0 / 0.0 0 / 0.00	B' 340.0 / 0.0
F Manufacturer & Model No. ransmitter Stability (+/-) ntenna Polarization ntenna Mfr., Size & Type ntenna Height - Pri/Div - AGL ntenna Gain - Pri/Div otal Primary Antenna Gain	: Lynx %: : 8' Ft: 340. dBi: 33.5 dBi:	CP2 0 / 0.0 0 / 0.00 67.00	B' 340.0 / 0.0 33.50 / 0.00
F Manufacturer & Model No. ransmitter Stability (+/-) ntenna Polarization ntenna Mfr., Size & Type ntenna Height - Pri/Div - AGL ntenna Gain - Pri/Div	: Lynx %: : 8' Ft: 340. dBi: 33.5	CP2 0 / 0.0 0 / 0.00 67.00	B' 340.0 / 0.0
F Manufacturer & Model No. ransmitter Stability (+/-) ntenna Polarization ntenna Mfr., Size & Type ntenna Height - Pri/Div - AGL ntenna Gain - Pri/Div otal Primary Antenna Gain ransmitter Power	: Lynx %: : 8' Ft: 340. dBi: 33.5 dBi: dBm: 13.0	CP2 0 / 0.0 0 / 0.00 67.00 0	8' 340.0 / 0.0 33.50 / 0.00
F Manufacturer & Model No. ransmitter Stability (+/-) ntenna Polarization ntenna Mfr., Size & Type ntenna Height - Pri/Div - AGL ntenna Gain - Pri/Div otal Primary Antenna Gain	: Lynx %: : 8' Ft: 340. dBi: 33.5 dBi: dBm: 13.0	CP2 0 / 0.0 0 / 0.00 67.00 0	B' 340.0 / 0.0 33.50 / 0.00
F Manufacturer & Model No. ransmitter Stability (+/-) ntenna Polarization ntenna Mfr., Size & Type ntenna Height - Pri/Div - AGL ntenna Gain - Pri/Div otal Primary Antenna Gain ransmitter Power otal System Gain	: Lynx %: : 8' Ft: 340. dBi: 33.5 dBi: dBm: 13.0 dB: 80.0	O / 0.0 0 / 0.00 67.00 0	8' 340.0 / 0.0 33.50 / 0.00
F Manufacturer & Model No. ransmitter Stability (+/-) ntenna Polarization ntenna Mfr., Size & Type ntenna Height - Pri/Div - AGL ntenna Gain - Pri/Div otal Primary Antenna Gain ransmitter Power otal System Gain ====================================	: Lynx %: : 8' Ft: 340. dBi: 33.5 dBi: dBm: 13.0 dB: 80.0 = = = = = = = = = = = = = = = = = = =	0 / 0.0 0 / 0.00 67.00 0	<pre>B' 340.0 / 0.0 33.50 / 0.00 13.00 80.00 = = = = = = = = = = = = = = = = = = =</pre>
F Manufacturer & Model No. ransmitter Stability (+/-) ntenna Polarization ntenna Mfr., Size & Type ntenna Height - Pri/Div - AGL ntenna Gain - Pri/Div otal Primary Antenna Gain ransmitter Power otal System Gain = = = = = = = = = = = = = = = = = = =	: Lynx %: : 8' Ft: 340. dBi: 33.5 dBi: dBm: 13.0 dB: 80.0 = = = = = = = = = = = = = = = = = = =	0 / 0.0 0 / 0.00 67.00 0 	B' 340.0 / 0.0 33.50 / 0.00 13.00 80.00 = = = = = = = = = = = = = = = = = = =
F Manufacturer & Model No. ransmitter Stability (+/-) ntenna Polarization ntenna Mfr., Size & Type ntenna Height - Pri/Div - AGL ntenna Gain - Pri/Div otal Primary Antenna Gain ransmitter Power otal System Gain = = = = = = = = = = = = = = = = = = =	: Lynx %: : 8' Ft: 340. dBi: 33.5 dBi: dBm: 13.0 dB: 80.0 = = = = = = = = = = = = = = = = = = =	0 / 0.0 0 / 0.00 67.00 0 	B' 340.0 / 0.0 33.50 / 0.00 13.00 80.00 = = = = = = = = = = = = = = = = = = =
F Manufacturer & Model No. ransmitter Stability (+/-) ntenna Polarization ntenna Mfr., Size & Type ntenna Height - Pri/Div - AGL ntenna Gain - Pri/Div otal Primary Antenna Gain ransmitter Power otal System Gain ====================================	: Lynx %: : 8' Ft: 340. dBi: 33.5 dBi: dBm: 13.0 dB: 80.0 ======= dBm: 36.0 dBm:-60.8 ======= dBm:-90.0 dB:+29.2	O / 0.0 O / 0.00 67.00 O	B' 340.0 / 0.0 33.50 / 0.00 13.00
F Manufacturer & Model No. ransmitter Stability (+/-) ntenna Polarization ntenna Mfr., Size & Type ntenna Height - Pri/Div - AGL ntenna Gain - Pri/Div otal Primary Antenna Gain ransmitter Power otal System Gain = = = = = = = = = = = = = = = = = = =	: Lynx %: : 8' Ft: 340. dBi: 33.5 dBi: dBm: 13.0 dB: 80.0 = = = = = = = = = = = = = = = = = = =	O / 0.0 O / 0.00 67.00 O	<pre>B' 340.0 / 0.0 33.50 / 0.00 13.00</pre>
F Manufacturer & Model No. ransmitter Stability (+/-) ntenna Polarization ntenna Mfr., Size & Type ntenna Height - Pri/Div - AGL ntenna Gain - Pri/Div otal Primary Antenna Gain ransmitter Power otal System Gain ====================================	: Lynx %: : 8' Ft: 340. dBi: 33.5 dBi: dBm: 13.0 dB: 80.0 = = = = = = = = = = = = = = = = = = =	O / 0.0 O / 0.00 67.00 O	B' 340.0 / 0.0 33.50 / 0.00 13.00
F Manufacturer & Model No. ransmitter Stability (+/-) ntenna Polarization ntenna Mfr., Size & Type ntenna Height - Pri/Div - AGL ntenna Gain - Pri/Div otal Primary Antenna Gain ransmitter Power	: Lynx %: : 8' Ft: 340. dBi: 33.5 dBi: dBm: 13.0 dB: 80.0 ====== dBm: 36.0 dBm:-60.8 ====== dBm:-90.0 dB:+29.2 ======= %: 99.9 c/Year: 100.	O / 0.0 0 / 0.00 67.00 0 	8' 340.0 / 0.0 33.50 / 0.00 13.00
F Manufacturer & Model No. ransmitter Stability (+/-) ntenna Polarization ntenna Mfr., Size & Type ntenna Height - Pri/Div - AGL ntenna Gain - Pri/Div otal Primary Antenna Gain ransmitter Power otal System Gain ====================================	: Lynx %: : 8' Ft: 340. dBi: 33.5 dBi: dBm: 13.0 dB: 80.0 ====== dBm: 36.0 dBm:-60.8 ====== dBm:-90.0 dB:+29.2 ====== %: 99.9 c/Year: 100. errored-seco	0 / 0.0 0 / 0.00 67.00 0 	8' 340.0 / 0.0 33.50 / 0.00 13.00
F Manufacturer & Model No. ransmitter Stability (+/-) ntenna Polarization ntenna Mfr., Size & Type ntenna Height - Pri/Div - AGL ntenna Gain - Pri/Div otal Primary Antenna Gain ransmitter Power otal System Gain ====================================	: Lynx %: : 8' Ft: 340. dBi: 33.5 dBi: dBm: 13.0 dB: 80.0 ====== dBm: 36.0 dBm:-60.8 ====== dBm:-90.0 dB:+29.2 ======= %: 99.9 c/Year: 100. errored-seco	0 / 0.0 0 / 0.00 67.00 0 	8' 340.0 / 0.0 33.50 / 0.00 13.00
F Manufacturer & Model No. ransmitter Stability (+/-) ntenna Polarization ntenna Mfr., Size & Type ntenna Height - Pri/Div - AGL ntenna Gain - Pri/Div otal Primary Antenna Gain ransmitter Power otal System Gain ====================================	: Lynx %: : 8' Ft: 340. dBi: 33.5 dBi: dBm: 13.0 dB: 80.0 ====== dBm: 36.0 dBm:-60.8 ====== dBm:-90.0 dB:+29.2 ====== %: 99.9 c/Year: 100. errored-seco	0 / 0.0 0 / 0.00 67.00 0 	8' 340.0 / 0.0 33.50 / 0.00 13.00

JEFA INTERNATIONAL, INC 1108 DOBIE DRIVE PLANO, TX 75074 09:31:48 06-10-1994 SITEAB.CP2

****** 8 * Microwave Path Analysis * ************** 2450 MHz: 2450 equency : SITE B : SITA A ce DMS: 33 :30:0 00 N 33 :36:45.0 N DMS: 087:45:00.0 W 087:43:00.0 W titude ngitude Ft: 0 evation - AMSL Ft: 0 wer Height Deg: 013.923 imuth 193.942 th Length - Inverse Pos. Mi/km: 7.988 / 12.856 dB: 122.43 ---> <--- 122.43 th Loss dB: ffraction Loss 0.00 in Attenuation dB: 0.00 : LDF5-50A Ft: 87.0 ansmission Line Type LDF5-50A ansmission Line Length 87.0 ansmission Line Loss/100 Ft dB: 2.30 2.30 2.00 dB: 2.00 ansmission Line Loss dB: 0.50 mper Loss 0.50 dB: 0.50 dB: 0.00 dB: 0.00 dB: 0.00 dB: 0.00 tenna Radome Loss 0.00 0.00 it Stdby Switch Loss ceiver Hybrid Loss 0.00 it Power Splitter Loss 0.00 Branching Loss 0.00 nnector & Safety Loss dB: 1.50 1.50 it Attenuator Pad Loss dB: 6.50 6.50 vr Attenuator Pad Loss dB: 0.00 0.00 tal System Loss dB: 136.93 ---> <--- 136.93 Manufacturer & Model No. : LynxCP2 LynxCP2 ansmitter Stability (+/-) %: tenna Polarization :

tenna Mfr., Size & Type : 8' 8'

tenna Height - Pri/Div - AGL Ft: 57.0 / 0.0 57.0 / 0.0

tenna Gain - Pri/Div dBi: 33.50 / 0.00 33.50 / 0.00

tal Primary Antenna Gain dBi: 67.00

ansmitter Power dBm: 13.00 13.00 tal System Gain dB: 80.00 80.00 Threshold dBm:-90.00 -90.00 mposite Fade Margin dB:+33.10 +33.10

* Outages are one-way severe errored-seconds per year for 1x10E-6 BER * *

PLANO, TX 75074

imate & Terrain: 6.000 Terrain Rough.: 40.0 Avrg. Temp: 68 de Margins (dB): DFM: 81 AIFM: 0 Model: Digital TFM: 33.1 EIFM: 0 JEFA INTERNATIONAL, INC 1108 DOBIE DRIVE

09:27:14 06-10-1994 SITEAB, CP2

```
MHz: 2450
                                                           2450
requency
                                    : SITA A
                                                           SITE B
_te
                                  DMS: 33 :30:0 00 N
                                                          33 :37:21.0 N
ititude
                                  DMS: 087:45:00.0 W
                                                         087:43:00.0 W
ongitude
                                 Ft: 0
_evation - AMSL
                                  Ft: 0
wer Height
                                 Deg: 012.824
                                                           192.843
:imuth
ith Length - Inverse Pos. Mi/km: 8.659 / 13.935
                                 dB: 123.13 ---> <--- 123.13
ath Loss
                                   dB:
ffraction Loss
                                                 0.00
                                   dB:
                                                 0.00
ain Attenuation
                                  : LDF5-50A
cansmission Line Type
                                 : LDF5
Ft: 87.0
dB: 2.30
                                                           LDF5-50A
ransmission Line Length
                                   Ft: 87.0
                                                          87.0
ransmission Line Loss/100 Ft
                                                          2.30
                                  dB: 2.00
                                                          2.00
cansmission Line Loss
                                   dB: 0.50
                                                          0.50
imper Loss

      Imper Loss
      dB: 0.50
      0.50

      itenna Radome Loss
      dB: 0.00
      0.00

      mit Stdby Switch Loss
      dB: 0.00
      0.00

      eceiver Hybrid Loss
      dB: 0.00
      0.00

      mit Power Splitter Loss
      dB: 0.00
      0.00

      F Branching Loss
      dB: 0.00
      0.00

      connector & Safety Loss
      dB: 1.50
      1.50

      mit Attenuator Pad Loss
      dB: 6.50
      6.50

      cvr Attenuator Pad Loss
      dB: 0.00
      0.00

itenna Radome Loss
nit Stdby Switch Loss
eceiver Hybrid Loss
nit Power Splitter Loss
F Branching Loss
onnector & Safety Loss
nit Attenuator Pad Loss
cvr Attenuator Pad Loss
                          dB: 137.63 ---> <--- 137.63
otal System Loss
dBm: 13.00
ransmitter Power
                                                           13.00
 dB: 80.00 80.00
otal System Gain
 ffective Radiated Power dBm: 36.00 36.00 afaded Receive Signal Level dBm:-57.63 ---> <--- -57.63

      x Threshold
      dBm:-90.00
      -90.00

      omposite Fade Margin
      dB:+32.40
      +32.40

 %: 99.99968266 99.99968266
Sec/Year: 100.07 100.07
ropagation Reliability
                        Sec/Year: 100.07
 * Outages are one-way severe errored-seconds per year for 1x10E-6 BER * *
limate & Terrain: 4.000 Terrain Rough.: 100.0 Avrg. Temp: 68
ade Margins (dB): DFM: 81 AIFM: 0 Model: Digital
                      TFM: 32.4
                                        EIFM: 0
```

JEFA INTERNATIONAL, INC 1108 DOBIE DRIVE PLANO, TX 75074 09:37:57 06-10-1994 SITEAB.CP2 June 22, 1994

Mr. Jim Davis Southern Communications Services 600 North 18th Street Birmingham, AL 35291

RE: Reliability Calculations for Western Multiplex 6 GHz Spread Spectrum Radio

Dear Jim:

Enclosed please find reliability calculations for four hypothetical microwave paths using Western Multiplex 1-DS1 6 GHz spread spectrum radios. The Lynx CP6 with maximum EIRP of +36.0 dBm (new FCC rules) are shown. All the paths have 100 or 101 seconds per year predicted outage (99.99968% availability).

Path Num-	Radio Model	Transmit Power (dBm)	EIRP Climate/ Terrain (dBm)	Coax Length (feet)	Antenna Diameter (feet)	Path Length (miles)
1	LynxCP6	variable	+36.0 difficult	87	4	4.29
2	LynxCP6	variable	+36.0 average	87	4	4.67
3	LynxCP6	variable	+36.0 difficult	87	8	5.66
4	LynxCP6	variable	+36.0 average	87	8	6.14

Note that the coax lengths are relatively short and higher antenna heights will decrease the effective range of the systems. These calculations were done using 4' and 8' diameter dishes. Other dish sizes are available and would give slightly different results. Please call me at 1869 if you have any questions or require additional information.

Sincerely.

John Post

Survey Manager

JEP/me

Enclosures

CC: Kishore Asirvadam, JEFA International

* Microwave Path Analysis *

```
MHz: 6145
                                                                                                                                                                                                                                                               6145
   requency
                                                                                                                                                      : SITE A
                                                                                                                                                                                                                                                            SITE B
    ite
                                                                                                                                              : SITE A
DMS: 33 :30:00.0 N
                                                                                                                                              DMS: 33:30:00.0 N 33:33:20.5 N DMS: 087:45:00.0 W 087:43:00.0 W
   atitude
   ongitude
                                                                                                                                                Ft: 0
  levation - AMSL
  'ower Height
                                                                                                                                                   Ft: 0
                                                                                                                                          Deg: 026.614
  Peg: 026.614
Path Length - Inverse Pos. Mi/km: 4.293 / 6.910
                                                                                                                                                                                                                                                                206.633
                                                                                                                                             dB: 125.03 ---> <--- 125.03
dB: 0.00
  'ath Loss
                                                                                                                                                      dB: 0.00
  )iffraction Loss
                                                                                                                                                                                                                   0.00
                                                                                                                                                  dB:
  tain Attenuation
 Transmission Line Type
Transmission Line Length
Transmission Line Loss/100 Ft
Transmission Line Loss/100 Ft

Character Line Loss

Chara
                                                                                                                                                                                                                                                               WE65
                                                                                                                                                                                                                                                             87.0
                                                                                                                                                                                                                                                          1.35
1.17
                                                                                                                                                  dB: 0.50
                                                                                                                                                                                                                                                           0.50
  umper Loss
                                                                                                                                                 dB: 1.00
  intenna Radome Loss
                                                                                                                                                                                                                                                           1.00
  interna kadome Letter init Stdby Switch Loss
mit Stdby Switch Loss

mit Stdby Switch Loss

dB: 0.00

dB: 0.00

dB: 0.00

mit Power Splitter Loss

dB: 0.00

dB: 0.00

dB: 0.00

connector & Safety Loss

dB: 0.50

dB: 0.50

dB: 0.50

connector Pad Loss

dB: 24.00

dB: 0.00

connector Pad Loss

dB: 0.00

dB: 0.50

dB: 0.50

dB: 0.00

connector Pad Loss

dB: 0.00

dB: 0.00

connector Pad Loss

dB: 0.00

dB: 0.00

connector Pad Loss

dB: 0.00

dB: 0.00

dB: 0.00

connector Pad Loss

dB: 0.00

dB: 0.00

connector Pad Loss

dB: 0.00

dB: 0.00

dB: 0.00

connector Pad Loss
 Total System Loss dB: 155.38 ---> <--- 155.38
 %F Manufacturer & Model No. : LYNX CP6
%ransmitter Stability (+/-) %:
%ptenna Polarization
                                                                                                                                                                                                                                                           LYNX CP6
Intenna Polarization
Intenna Mfr., Size & Type
Intenna Height - Pri/Div - AGL
Intenna Gain - Pri/Div | Charles Gain | Charles 
Cotal System Gain dB: 98.40 98.40
 Iffective Radiated Power dBm: 36.03 36.03
Infaded Receive Signal Level dBm: -56.98 ---> <--- -56.98
tx ThresholddBm:-86.00-86.00Composite Fade MargindB:+29.00+29.00

      Propagation Reliability
      %: 99.99968153
      99.99968153

      Putage
      Sec/Year: 100.42
      100.42

 * * Outages are one-way severe errored-seconds per year for 1x10E-6 BER * *
Climate & Terrain: 6.000 Terrain Rough: 40.0 Avrg. Temp: 68

Fade Margins (dB): DFM: 81 AIFM: 0 Model: Digital

TFM: 29.0 EIFM: 0
```

JEFA INTERNATIONAL, INC 1108 DOBIE DRIVE PLANO, TX 75074 14:28:36 06-22-1994 SITEAB.CP6 **********

* Microwave Path Analysis *

```
MHz: 6145
                                                      6145
requency
                                : SITE A
                                                     SITE B
ite
                               DMS: 33:30:00.0 N 33:33:42.0 N DMS: 087:45:00.0 W . 087:43:00.0 W
atitude
ongitude
:levation - AMSL
                               Ft: 0
                               Ft: 0
'ower Height
                              Deg: 024.348
zimuth
                                                      204.366
ath Length - Inverse Pos. Mi/km: 4.665 / 7.508
                                dB: 125.75 ---> <--- 125.75
ath Loss
                                            0.00
                                dB:
)iffraction Loss
                                            0.00
                                dB:
tain Attenuation
                                : WE65
ransmission Line Type
                                                      WE65
ransmission Line Length
                               Ft: 87.0
                                                      87.0
ransmission Line Loss/100 Ft
                              dB: 1.35
                                                     1.35
                               dB: 1.17
ransmission Line Loss
                                                     1.17
                               dB: 0.50
                                                      0.50
umper Loss
                                                   . 1.00
                              dB: 1.00
intenna Radome Loss
                                                     0.00
                              dB: 0.00
mit Stdby Switch Loss
                               dB: 0.00
                                                     0.00
Receiver Hybrid Loss
                             dB: 0.00
dB: 0.00
dB: 0.50
                                                     0.00
mit Power Splitter Loss
                                                     0.00
F Branching Loss
Connector & Safety Loss
                                                     0.50
Imit Attenuator Pad LossdB: 24.0024.002cvr Attenuator Pad LossdB: 0.000.00
Otal System Loss dB: 156.10 ---> <--~ 156.10
%F Manufacturer & Model No. : LYNX CP6
%ransmitter Stability (+/-) %:
%ntenna Polarization :
                                                     LYNX CP6
57.0 / 0.0
                                                     35.20 / 0.00
otal System Gain dB: 98.40
                                                      98.40
Iffective Radiated Power dBm: 36.03 36.03
Infaded Receive Signal Level dBm: -57.70 ---> <--- -57.70
tx Threshold dBm:~86.00 -86.00 composite Fade Margin dB:+28.30 +28.30

        Propagation Reliability
        %: 99.99968004
        99.99968004

        Putage
        Sec/Year: 100.90
        100.90

* Outages are one-way severe errored-seconds per year for 1x10E-6 BER * *
limate & Terrain: 4.000 Terrain Rough.: 100.0 Avrg. Temp: 68
'ade Margins (dB): DFM: 81 AIFM: 0 Model: Digital TFM: 28.3 EIFM: 0
```

JEFA INTERNATIONAL, INC 1108 DOBIE DRIVE PLANO, TX 75074 14:30:28 06-22-1994 SITEAB.CP6

* Microwave Path Analysis *

Frequency		6145	6145
	:	SITE A 33 :30:00.0 N	SITE B
Latitude	DMS:	33 :30:00.0 N	33 :34:38.0 N
longi tude	DMS:	087:45:00.0 W	087:43:00.0 W
Latitude Longitude Slevation - AMSL	Ft:		0
Tower Height	Ft:	Ô	Ö
The state of the s		019.865	199.883
Azimuth Path Length - Inverse Pos.	Deg.	5 650 / 0 107	
	MIT/KM:	3.639 / 9.107	107 40
Path Loss		127.43> <	147.43
Diffraction Loss	dB:	0.00	
Rain Attenuation	an:	0.00	
Fransmission Line Type	:	WE65	WE65
Fransmission Line Length	Ft:		87.0
Transmission Line Loss/100 Ft	dB:	1.35	1.35
Transmission Line Loss	dB:	1.17	1.17
Jumper Loss	dB ·	0.50	0.50
Intenna Radome Loss	đB:	1.00	1.00
Mmit Stdby Switch Loss	dB:	0.00	0.00
Receiver Hybrid Loss	dB.	0.00	0.00
(mit Power Splitter Loss	ab.	0.00	0.00
Will Power Spiriter Loss	ab.	0.00	
Connector & Safety Loss	ab:	0.83	
<pre>{mit Attenuator Pad Loss</pre>	aB:	30.00	
Royr Attenuator Pad Loss	dB:	0.00	0.00
Total System Loss	dB:	164.43> <	164.43
,	====		
<pre></pre>			
	:	LINA CP6	LINX CP6
Fransmitter Stability (+/-)	; *:	LINK CP6	LINA CP6
Fransmitter Stability (+/-)	*:		LINK CP6
Fransmitter Stability (+/-)	*:		
Fransmitter Stability (+/-) Antenna Polarization Antenna Mfr., Size & Type	*: :	8'	8'
Fransmitter Stability (+/-) Antenna Polarization Antenna Mfr., Size & Type Antenna Height - Pri/Div - AGL	*: : : Ft:	8' 57.0 / 0.0	8' 57.0 / 0.0
Fransmitter Stability (+/-) Antenna Polarization Antenna Mfr., Size & Type Antenna Height - Pri/Div - AGL Antenna Gain - Pri/Div	*: : : Ft: dBi:	8' 57.0 / 0.0 41.50 / 0.00	8' 57.0 / 0.0
Fransmitter Stability (+/-) Antenna Polarization Antenna Mfr., Size & Type Antenna Height - Pri/Div - AGL Antenna Gain - Pri/Div Fotal Primary Antenna Gain	%: : : Ft: dBi: dBi:	8' 57.0 / 0.0 41.50 / 0.00 83.00	8' 57.0 / 0.0 41.50 / 0.00
Fransmitter Stability (+/-) Antenna Polarization Antenna Mfr., Size & Type Antenna Height - Pri/Div - AGL Antenna Gain - Pri/Div Fotal Primary Antenna Gain	%: : : Ft: dBi: dBi:	8' 57.0 / 0.0 41.50 / 0.00	8' 57.0 / 0.0
Transmitter Stability (+/-) Antenna Polarization Antenna Mfr., Size & Type Antenna Height - Pri/Div - AGL Antenna Gain - Pri/Div Total Primary Antenna Gain Transmitter Power	%: : : : : : : : : : : : : : : : : : :	8' 57.0 / 0.0 41.50 / 0.00 83.00 28.00	8' 57.0 / 0.0 41.50 / 0.00 28.00
Transmitter Stability (+/-) Antenna Polarization Antenna Mfr., Size & Type Antenna Height - Pri/Div - AGL Antenna Gain - Pri/Div Total Primary Antenna Gain Transmitter Power	%: : : : : : : : : : : : : : : : : : :	8' 57.0 / 0.0 41.50 / 0.00 83.00	8' 57.0 / 0.0 41.50 / 0.00
Fransmitter Stability (+/-) Antenna Polarization Antenna Mfr., Size & Type Antenna Height - Pri/Div - AGL Antenna Gain - Pri/Div Fotal Primary Antenna Gain Fransmitter Power Fotal System Gain	Ft: dBi: dBi: dBm:	8' 57.0 / 0.0 41.50 / 0.00 83.00 28.00	8' 57.0 / 0.0 41.50 / 0.00 28.00 111.00
Fransmitter Stability (+/-) Antenna Polarization Antenna Mfr., Size & Type Antenna Height - Pri/Div - AGL Antenna Gain - Pri/Div Fotal Primary Antenna Gain Fransmitter Power Fotal System Gain	Ft: dBi: dBi: dBm:	8' 57.0 / 0.0 41.50 / 0.00 83.00 28.00	8' 57.0 / 0.0 41.50 / 0.00 28.00 111.00
Fransmitter Stability (+/-) Antenna Polarization Antenna Mfr., Size & Type Antenna Height - Pri/Div - AGL Antenna Gain - Pri/Div Fotal Primary Antenna Gain Fransmitter Power Fotal System Gain	Ft: dBi: dBi: dBm:	8' 57.0 / 0.0 41.50 / 0.00 83.00 28.00	8' 57.0 / 0.0 41.50 / 0.00 28.00 111.00
Fransmitter Stability (+/-) Antenna Polarization Antenna Mfr., Size & Type Antenna Height - Pri/Div - AGL Antenna Gain - Pri/Div Fotal Primary Antenna Gain Fransmitter Power Fotal System Gain	Ft: dBi: dBi: dBm: dB: dBm:	8' 57.0 / 0.0 41.50 / 0.00 83.00 28.00 111.00 ================================	8' 57.0 / 0.0 41.50 / 0.00 28.00 111.00
Transmitter Stability (+/-) Antenna Polarization Antenna Mfr., Size & Type Antenna Height - Pri/Div - AGL Antenna Gain - Pri/Div Total Primary Antenna Gain Transmitter Power Total System Gain Effective Radiated Power Infaded Receive Signal Level	Ft: dBi: dBi: dBm: dB:	8' 57.0 / 0.0 41.50 / 0.00 83.00 28.00 111.00 36.00 -53.43> <	8' 57.0 / 0.0 41.50 / 0.00 28.00 111.00 36.00 -53.43
Transmitter Stability (+/-) Antenna Polarization Antenna Mfr., Size & Type Antenna Height - Pri/Div - AGL Antenna Gain - Pri/Div Total Primary Antenna Gain Transmitter Power Total System Gain Effective Radiated Power Infaded Receive Signal Level Ex Threshold	Ft: dBi: dBi: dBm: dB: dBm: dBm: dBm:	8' 57.0 / 0.0 41.50 / 0.00 83.00 28.00 111.00 36.00 -53.43> <	8' 57.0 / 0.0 41.50 / 0.00 28.00 111.00 36.00 -53.43 -86.00
Transmitter Stability (+/-) Antenna Polarization Antenna Mfr., Size & Type Antenna Height - Pri/Div - AGL Antenna Gain - Pri/Div Total Primary Antenna Gain Transmitter Power Total System Gain Effective Radiated Power Infaded Receive Signal Level Ex Threshold Composite Fade Margin	Ft: dBi: dBi: dBm: dB: dBm: dBm: dBm: dBm: dBm:	8' 57.0 / 0.0 41.50 / 0.00 83.00 28.00 111.00 36.00 -53.43> <86.00 -32.60	8' 57.0 / 0.0 41.50 / 0.00 28.00 111.00 36.00 -53.43 ==================================
Transmitter Stability (+/-) Antenna Polarization Antenna Mfr., Size & Type Antenna Height - Pri/Div - AGL Antenna Gain - Pri/Div Total Primary Antenna Gain Transmitter Power Total System Gain Effective Radiated Power Infaded Receive Signal Level TX Threshold Composite Fade Margin	Ft: dBi: dBi: dBm: dBm: dBm: dBm: dBm: dBm:	8' 57.0 / 0.0 41.50 / 0.00 83.00 28.00	8' 57.0 / 0.0 41.50 / 0.00 28.00 111.00 36.00 -53.43 -86.00 +32.60
Fransmitter Stability (+/-) Intenna Polarization Intenna Mfr., Size & Type Intenna Mfr., Size & Type Intenna Height - Pri/Div - AGL Intenna Gain - Pri/Div Fotal Primary Antenna Gain Fransmitter Power Fotal System Gain Sffective Radiated Power Infaded Receive Signal Level Threshold Composite Fade Margin Propagation Reliability	#: Ft: dBi: dBi: dBm: dBm: dBm: dBm: dBm: dBm:	8' 57.0 / 0.0 41.50 / 0.00 83.00 28.00	8' 57.0 / 0.0 41.50 / 0.00 28.00 111.00 36.00 -53.43 = = = = = = = = = = = = = = = = = = =
Fransmitter Stability (+/-) Intenna Polarization Intenna Mfr., Size & Type Intenna Height - Pri/Div - AGL Intenna Gain - Pri/Div Fotal Primary Antenna Gain Fransmitter Power Fotal System Gain Siffective Radiated Power Infaded Receive Signal Level Threshold Composite Fade Margin Propagation Reliability See See See See See See See See See Se	#: Ft: dBi: dBi: dBm: dBm: dBm: dBm: c/Year:	8' 57.0 / 0.0 41.50 / 0.00 83.00 28.00	8' 57.0 / 0.0 41.50 / 0.00 28.00 111.00 36.00 -53.43 -86.00 +32.60 99.99968171 100.37
Fransmitter Stability (+/-) Intenna Polarization Intenna Mfr., Size & Type Intenna Height - Pri/Div - AGL Intenna Gain - Pri/Div Fotal Primary Antenna Gain Fransmitter Power Fotal System Gain Effective Radiated Power Infaded Receive Signal Level Ex Threshold Composite Fade Margin Propagation Reliability Outage Se Outages are one-way severe	Ft: dBi: dBi: dBm: dBm: dBm: dBm: dBm: c/Year: errored	8' 57.0 / 0.0 41.50 / 0.00 83.00 28.00	8' 57.0 / 0.0 41.50 / 0.00 28.00 111.00 36.00 -53.43 -86.00 +32.60 99.99968171 100.37 r 1x10E-6 BER * *
Fransmitter Stability (+/-) Intenna Polarization Intenna Mfr., Size & Type Intenna Height - Pri/Div - AGL Intenna Gain - Pri/Div Fotal Primary Antenna Gain Fransmitter Power Fotal System Gain Siffective Radiated Power Infaded Receive Signal Level Threshold Composite Fade Margin Propagation Reliability Sutage * Outages are one-way severe Limate & Terrain: 6.000	Ft: dBi: dBi: dBm: dB: dBm: dBm: dBm: dB: c/Year: errored.	8' 57.0 / 0.0 41.50 / 0.00 83.00 28.00	8' 57.0 / 0.0 41.50 / 0.00 28.00 111.00 36.00 -53.43 -86.00 +32.60 99.99968171 100.37 r 1x10E-6 BER * * . Temp: 68
Fransmitter Stability (+/-) Intenna Polarization Intenna Mfr., Size & Type Intenna Height - Pri/Div - AGL Intenna Gain - Pri/Div Fotal Primary Antenna Gain Fransmitter Power Fotal System Gain Fifective Radiated Power Infaded Receive Signal Level Infaded Receive Signal Level Topagation Reliability Sutage * Outages are one-way severe Limate & Terrain: 6.000 Fade Margins (dB): DFM: 81	Ft: dBi: dBi: dBm: dBm: dBm: dBm: dBm: dBr: dBr: drift dBrin	8' 57.0 / 0.0 41.50 / 0.00 83.00 28.00	8' 57.0 / 0.0 41.50 / 0.00 28.00 111.00 36.00 -53.43 -86.00 +32.60 99.99968171 100.37 r 1x10E-6 BER * *
Fransmitter Stability (+/-) Intenna Polarization Intenna Mfr., Size & Type Intenna Height - Pri/Div - AGL Intenna Gain - Pri/Div Fotal Primary Antenna Gain Fransmitter Power Fotal System Gain Siffective Radiated Power Infaded Receive Signal Level Threshold Composite Fade Margin Propagation Reliability Sutage * Outages are one-way severe Limate & Terrain: 6.000	Ft: dBi: dBi: dBm: dBm: dBm: dBm: dBm: dBr: dBr: drift dBrin	8' 57.0 / 0.0 41.50 / 0.00 83.00 28.00	8' 57.0 / 0.0 41.50 / 0.00 28.00 111.00 36.00 -53.43 -86.00 +32.60 99.99968171 100.37 r 1x10E-6 BER * * . Temp: 68

JEFA INTERNATIONAL, INC 1108 DOBIE DRIVE PLANO, TX 75074

14:34:42 06-22-1994 SITEAB.CP6

* Microwave Path Analysis *

Frequency		6145	6145
Site	:	SITE A	SITE B
Latitude	DMS:	33 :30:00.0 N 087:45:00.0 W	33 :35:04.5 N
Longitude	DMS:	087:45:00.0 W	087:43:00.0 W
Longitude Elevation - AMSL	Ft:	0	0
Tower Height	Ft:	0	0
Azimuth		018.254	198.273
Path Length - Inverse Pos.	Mi/km:	6.138 / 9.879	
Path Loss	dB:	128.13> <	128.13
Diffraction Loss	dB:	0.00	
Rain Attenuation	dB:		
Transmission Line Type	:	WE65	WE65
Transmission Line Type Transmission Line Length Transmission Line Loss/100 Ft Transmission Line Loss Jumper Loss	Ft:	87.0	87.0
Transmission Line Loss/100 Ft	dB:	1.35	1.35
Transmission Line Loss	đB:	1.17	1.17
Jumper Loss	dB:	0.50 1.00	0.50
Antenna Radome Loss	dB:	1.00	1.00
Xmit Stdby Switch Loss	dB:	0.00	0.00
Receiver Hybrid Loss Kmit Power Splitter Loss	dB:	0.00	0.00
Xmit Power Splitter Loss	dB:	0.00	0.00
RF Branching Loss	dB:	0.00	0.00
Connector & Safety Loss	dB:	0.83	0.83
Xmit Attenuator Pad Loss	đ₿:	30.00	
Royr Attenuator Pad Loss	dB:	0.00	0.00
Total System Loss		165.14> <	
	===		
RF Manufacturer & Model No.			
RF Manufacturer & Model No. Transmitter Stability (+/-)			
RF Manufacturer & Model No. Transmitter Stability (+/-) Antenna Polarization	: = = : : :	LYNX CP6	
RF Manufacturer & Model No. Transmitter Stability (+/-) Antenna Polarization Antenna Mfr., Size & Type	: = = : ; ; ; ;	LYNX CP6	LYNX CP6
RF Manufacturer & Model No. Transmitter Stability (+/-) Antenna Polarization	: = = : ; ; ; ;	LYNX CP6	LYNX CP6
RF Manufacturer & Model No. Transmitter Stability (+/-) Antenna Polarization Antenna Mfr., Size & Type	:	LYNX CP6	E E E E E E E E E E E E E E E E E E E
RF Manufacturer & Model No. Transmitter Stability (+/-) Antenna Polarization Antenna Mfr., Size & Type Antenna Height - Pri/Div - AGL Antenna Gain - Pri/Div	: 4: : : Ft: dBi:	LYNX CP6 8' 57.0 / 0.0 41.50 / 0.00	E E E E E E E E E E E E E E E E E E E
RF Manufacturer & Model No. Transmitter Stability (+/-) Antenna Polarization Antenna Mfr., Size & Type Antenna Height - Pri/Div - AGL Antenna Gain - Pri/Div Total Primary Antenna Gain	: i i Ft: dBi: dBi:	LYNX CP6 8' 57.0 / 0.0 41.50 / 0.00 83.00	E E E E E E E E E E E E E E E E E E E
RF Manufacturer & Model No. Transmitter Stability (+/-) Antenna Polarization Antenna Mfr., Size & Type Antenna Height - Pri/Div - AGL Antenna Gain - Pri/Div	: i i Ft: dBi: dBi:	LYNX CP6 8' 57.0 / 0.0 41.50 / 0.00	ETT TETT TETT TETT TETT TETT TETT TETT
RF Manufacturer & Model No. Transmitter Stability (+/-) Antenna Polarization Antenna Mfr., Size & Type Antenna Height - Pri/Div - AGL Antenna Gain - Pri/Div Total Primary Antenna Gain	Ft: dBi: dBi: dBm:	LYNX CP6 8' 57.0 / 0.0 41.50 / 0.00 83.00	ETT TETT TETT TETT TETT TETT TETT TETT
RF Manufacturer & Model No. Transmitter Stability (+/-) Antenna Polarization Antenna Mfr., Size & Type Antenna Height - Pri/Div - AGL Antenna Gain - Pri/Div Total Primary Antenna Gain Transmitter Power Total System Gain	#: Ft: dBi: dBi: dBm:	8' 57.0 / 0.0 41.50 / 0.00 83.00 28.00	E E E E E E E E E E E E E E E E E E E
RF Manufacturer & Model No. Transmitter Stability (+/-) Antenna Polarization Antenna Mfr., Size & Type Antenna Height - Pri/Div - AGL Antenna Gain - Pri/Div Total Primary Antenna Gain Transmitter Power Total System Gain	#: Ft: dBi: dBi: dBm:	8' 57.0 / 0.0 41.50 / 0.00 83.00 28.00	E E E E E E E E E E E E E E E E E E E
RF Manufacturer & Model No. Transmitter Stability (+/-) Antenna Polarization Antenna Mfr., Size & Type Antenna Height - Pri/Div - AGL Antenna Gain - Pri/Div Total Primary Antenna Gain Transmitter Power Total System Gain	#: Ft: dBi: dBi: dBm:	8' 57.0 / 0.0 41.50 / 0.00 83.00 28.00	E E E E E E E E E E E E E E E E E E E
RF Manufacturer & Model No. Transmitter Stability (+/-) Antenna Polarization Antenna Mfr., Size & Type Antenna Height - Pri/Div - AGL Antenna Gain - Pri/Div Total Primary Antenna Gain Transmitter Power Total System Gain Effective Radiated Power Unfaded Receive Signal Level	#: #: Bi: dBi: dBm: dBm:	B' 57.0 / 0.0 41.50 / 0.00 83.00 28.00 111.00	8' 57.0 / 0.0 41.50 / 0.00 28.00
RF Manufacturer & Model No. Transmitter Stability (+/-) Antenna Polarization Antenna Mfr., Size & Type Antenna Height - Pri/Div - AGL Antenna Gain - Pri/Div Total Primary Antenna Gain Transmitter Power Total System Gain Effective Radiated Power Unfaded Receive Signal Level Rx Threshold	#: #: #: dBi: dBi: dBm: dBm: dBm: dBm:	8' 57.0 / 0.0 41.50 / 0.00 83.00 28.00	E E E E E E E E E E E E E E E E E E E
RF Manufacturer & Model No. Transmitter Stability (+/-) Antenna Polarization Antenna Mfr., Size & Type Antenna Height - Pri/Div - AGL Antenna Gain - Pri/Div Total Primary Antenna Gain Transmitter Power Total System Gain Effective Radiated Power Unfaded Receive Signal Level Rx Threshold Composite Fade Margin	Ft: dBi: dBi: dBm: dBm: dBm: dBm: dBm:	8' 57.0 / 0.0 41.50 / 0.00 83.00 28.00 111.00 36.00 -54.14> <	E E E E E E E E E E E E E E E E E E E
RF Manufacturer & Model No. Transmitter Stability (+/-) Antenna Polarization Antenna Mfr., Size & Type Antenna Height - Pri/Div - AGL Antenna Gain - Pri/Div Total Primary Antenna Gain Transmitter Power Total System Gain Effective Radiated Power Unfaded Receive Signal Level Rx Threshold Composite Fade Margin	Ft: dBi: dBi: dBm: dBm: dBm: dBm: dBm:	8' 57.0 / 0.0 41.50 / 0.00 83.00 28.00 111.00 36.00 -54.14> <	E E E E E E E E E E E E E E E E E E E
RF Manufacturer & Model No. Transmitter Stability (+/-) Antenna Polarization Antenna Mfr., Size & Type Antenna Height - Pri/Div - AGL Antenna Gain - Pri/Div Total Primary Antenna Gain Transmitter Power Total System Gain Effective Radiated Power Unfaded Receive Signal Level Rx Threshold Composite Fade Margin Propagation Reliability	Ft: dBi: dBi: dBm: dBm: dBm: dBm: dBm:	8' 57.0 / 0.0 41.50 / 0.00 83.00 28.00 111.00 36.00 -54.14> <	E E E E E E E E E E E E E E E E E E E
RF Manufacturer & Model No. Transmitter Stability (+/-) Antenna Polarization Antenna Mfr., Size & Type Antenna Height - Pri/Div - AGL Antenna Gain - Pri/Div Total Primary Antenna Gain Transmitter Power Total System Gain Effective Radiated Power Unfaded Receive Signal Level Rx Threshold Composite Fade Margin Propagation Reliability Outage	Ft: dBi: dBi: dBm: dBm: dBm: dBm: dBm: dBm:	8' 57.0 / 0.0 41.50 / 0.00 83.00 28.00 111.0086.00 -31.90 99.99968180 100.34	E E E E E E E E E E E E E E E E E E E
RF Manufacturer & Model No. Transmitter Stability (+/-) Antenna Polarization Antenna Mfr., Size & Type Antenna Height - Pri/Div - AGL Antenna Gain - Pri/Div Total Primary Antenna Gain Transmitter Power Total System Gain Effective Radiated Power Unfaded Receive Signal Level Rx Threshold Composite Fade Margin Propagation Reliability Outage * Outages are one-way severe	Ft: dBi: dBi: dBm: dBm: dBm: dBm: dBm: c/Year: errored-	8' 57.0 / 0.0 41.50 / 0.00 83.00 28.00	E E E E E E E E E E E E E E E E E E E
RF Manufacturer & Model No. Transmitter Stability (+/-) Antenna Polarization Antenna Mfr., Size & Type Antenna Height - Pri/Div - AGL Antenna Gain - Pri/Div Total Primary Antenna Gain Transmitter Power Total System Gain Effective Radiated Power Unfaded Receive Signal Level Rx Threshold Composite Fade Margin Propagation Reliability Outage Se * Outages are one-way severe Climate & Terrain: 4.000	Ft: dBi: dBi: dBm: dBm: dBm: dBm: dBm: dBm: dBr: drrain	8' 57.0 / 0.0 41.50 / 0.00 83.00 28.00 111.00 36.00 -54.14> <86.00 -31.90	E E E E E E E E E E E E E E E E E E E
RF Manufacturer & Model No. Transmitter Stability (+/-) Antenna Polarization Antenna Mfr., Size & Type Antenna Height - Pri/Div - AGL Antenna Gain - Pri/Div Total Primary Antenna Gain Transmitter Power Total System Gain Effective Radiated Power Unfaded Receive Signal Level Rx Threshold Composite Fade Margin Propagation Reliability Outage * Outages are one-way severe Climate & Terrain: 4.000 Fade Margins (dB): DFM: 81	Ft: dBi: dBi: dBm: dBm: dBm: dBm: dBm: dBm: dBr: dBm: dBr: dBm: dBr: dBr: dBr: dBr: dBr: dBr: dBr: dBr	8' 57.0 / 0.0 41.50 / 0.00 83.00 28.00 111.00 36.00 -54.14> <86.00 -31.90 99.99968180 100.34 -seconds per year for Rough: 100.0 Avrg	E E E E E E E E E E E E E E E E E E E
RF Manufacturer & Model No. Transmitter Stability (+/-) Antenna Polarization Antenna Mfr., Size & Type Antenna Height - Pri/Div - AGL Antenna Gain - Pri/Div Total Primary Antenna Gain Transmitter Power Total System Gain Effective Radiated Power Unfaded Receive Signal Level Rx Threshold Composite Fade Margin Propagation Reliability Outage Se * Outages are one-way severe Climate & Terrain: 4.000	Ft: dBi: dBi: dBm: dBm: dBm: dBm: dBm: dBm: dBr: dBm: dBr: dBm: dBr: dBr: dBr: dBr: dBr: dBr: dBr: dBr	8' 57.0 / 0.0 41.50 / 0.00 83.00 28.00 111.00 36.00 -54.14> <86.00 -31.90 99.99968180 100.34 -seconds per year for Rough: 100.0 Avrg	E = E E E E E E E E E E E E E E E E E E

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